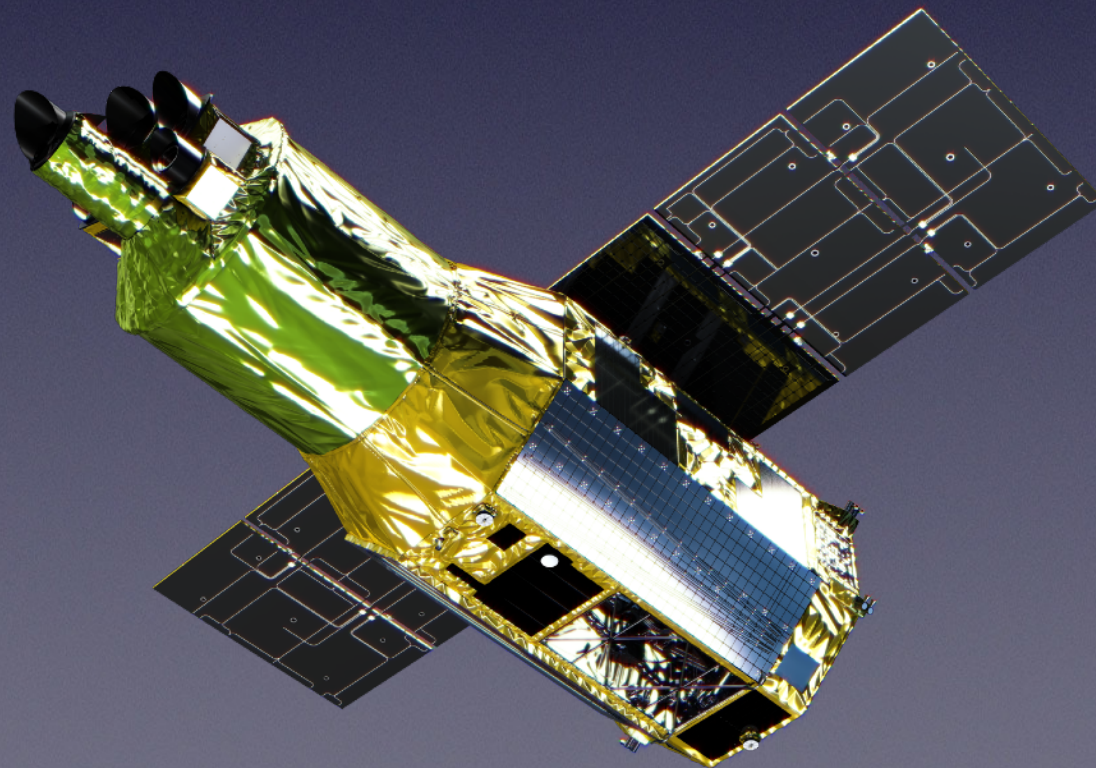


Status Report on the X-ray Imaging and Spectroscopy Mission (XRISM)

Brian Williams
NASA GSFC

**NASA XRISM Project
Scientist**

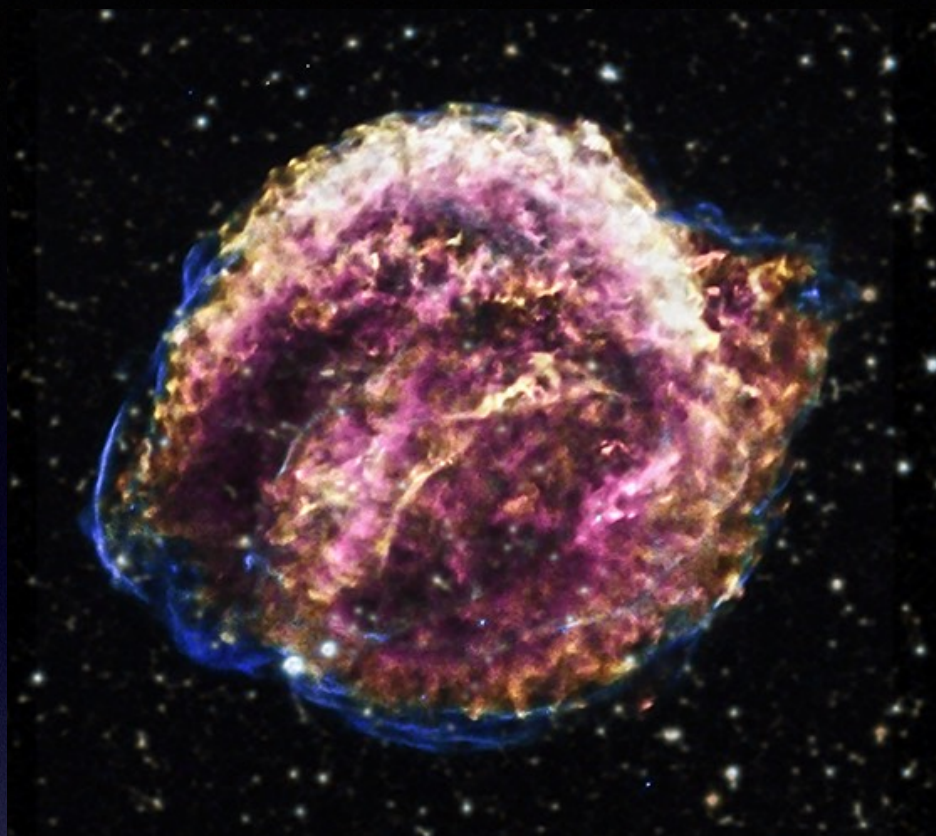


XRISM Executive Summary

XRISM, formerly the X-ray Astronomy Recovery Mission (XARM), is a JAXA/NASA collaborative mission with ESA participation. The objective of the mission is to investigate celestial X-ray objects in the Universe with high-throughput imaging and high-resolution spectroscopy, “recovering” the science that was lost as a result of the Hitomi (Astro-H) mission.

The XRISM payload consists of two instruments:

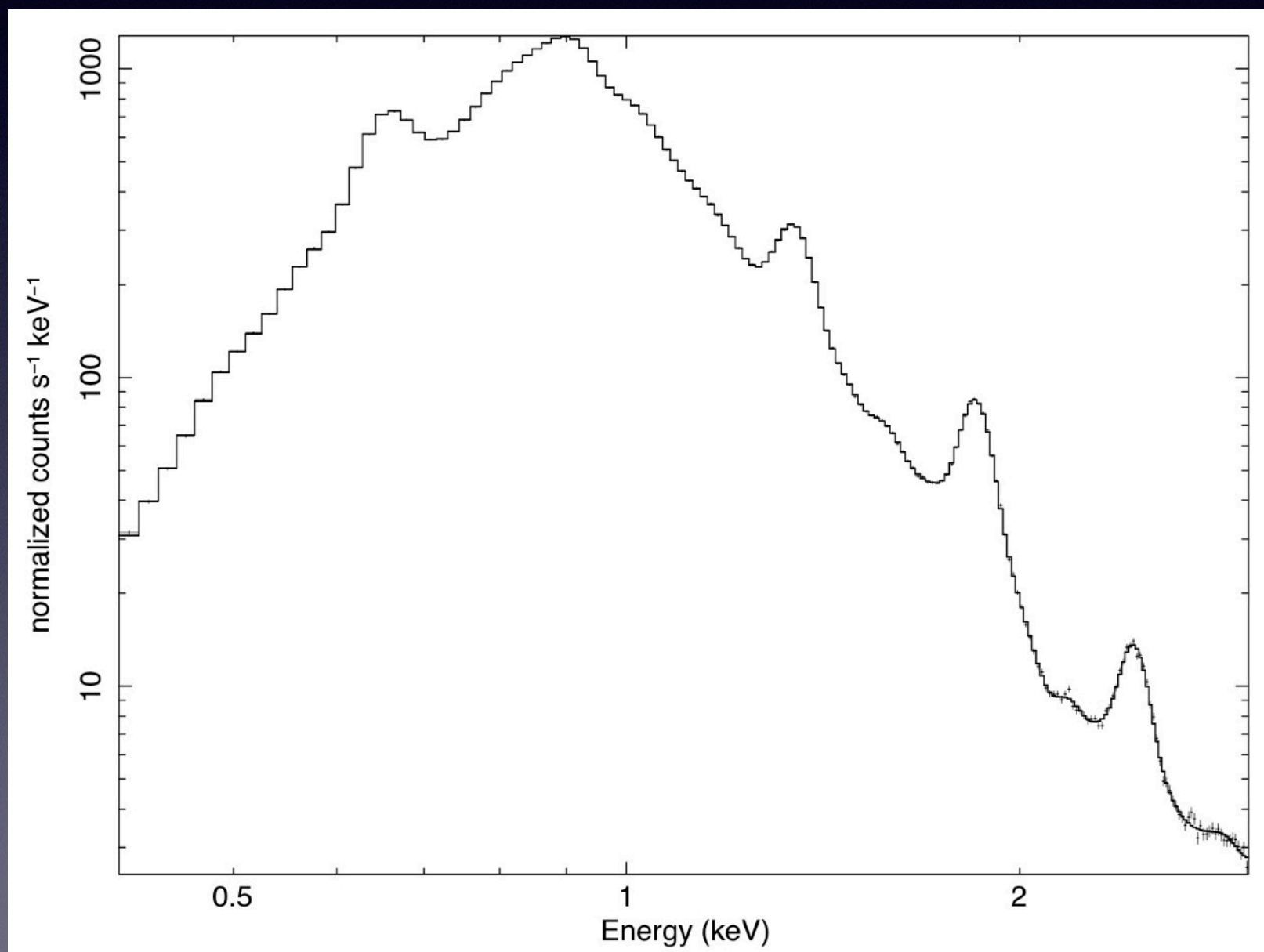
- **Resolve**: a soft X-ray spectrometer, which combines a lightweight X-Ray Mirror Assembly paired with an X-ray microcalorimeter spectrometer, and provides non-dispersive 5-7 eV energy resolution in the 0.3-12 keV bandpass with a field of view of about 3 arcmin.
- **Xtend**: a soft X-ray imager, is a CCD detector that extends the field of the observatory to 38 arcmin over the energy range 0.4-13 keV, using an identical lightweight X-Ray Mirror Assembly.



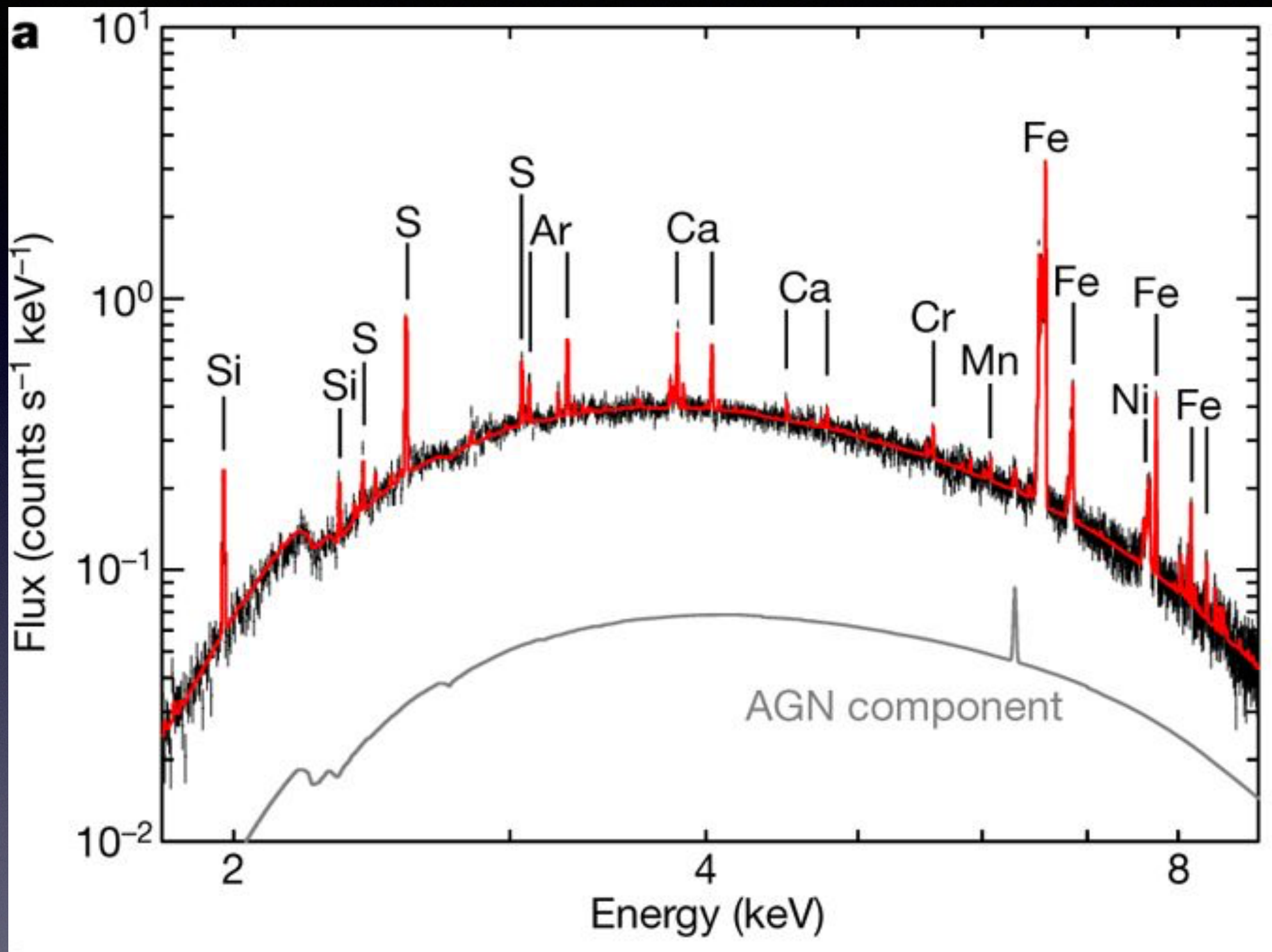
Kepler's SNR

Thermal emission
from a 1 keV
shocked plasma

Non-dispersive High-resolution X-ray Spectroscopy

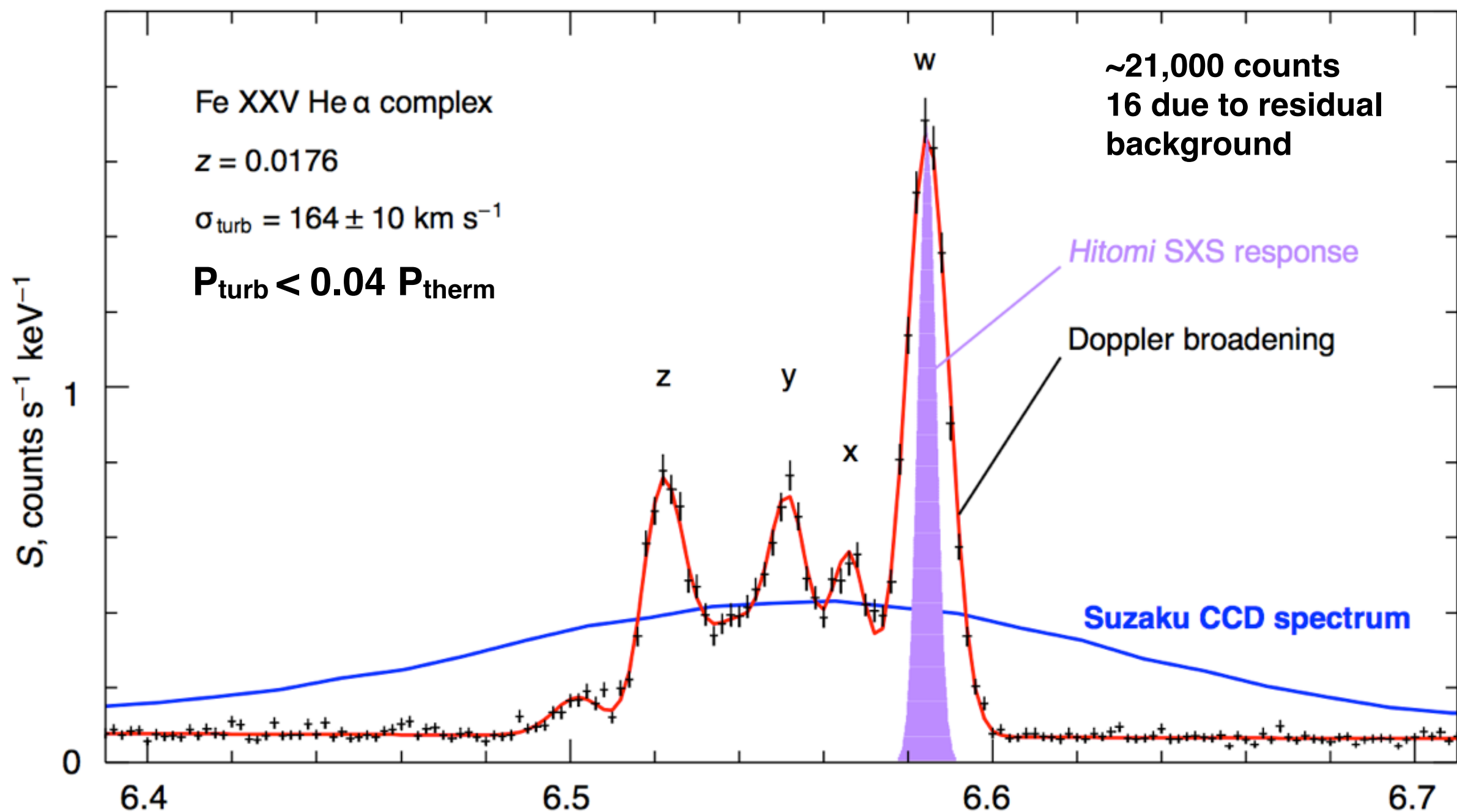


Results from Hitomi



2016 Hitomi spectrum of Perseus Cluster

5 eV energy resolution achieved in orbit, full array



Hitomi Collaboration, Nature, 2016

Black: Hitomi SXS data

Purple: SXS line response function

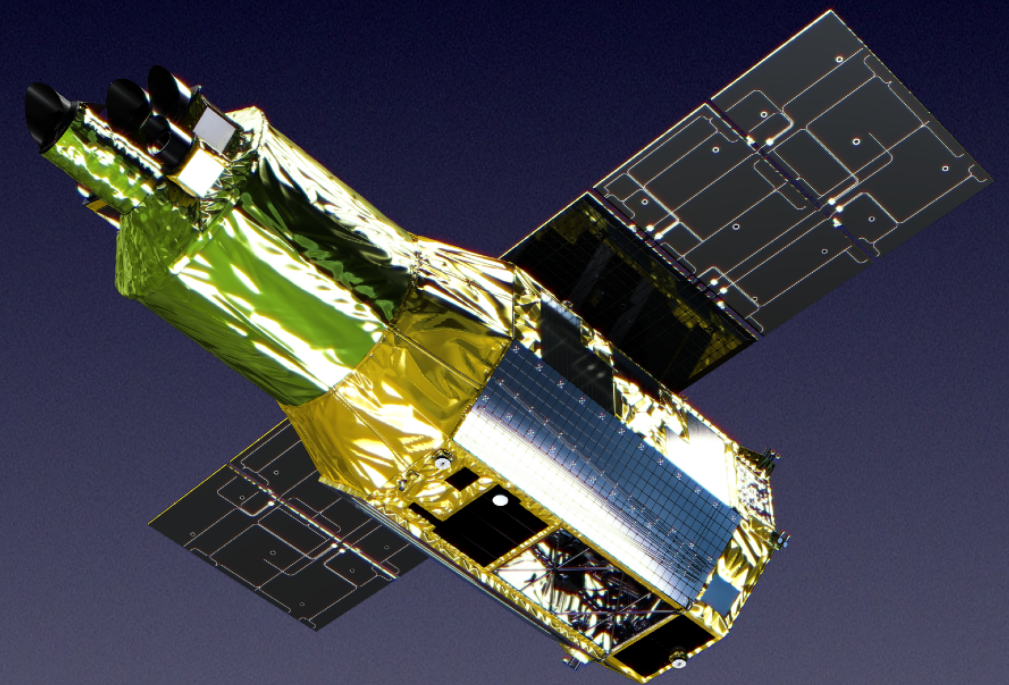
Blue: Best previous spectrum (Suzaku CCD)

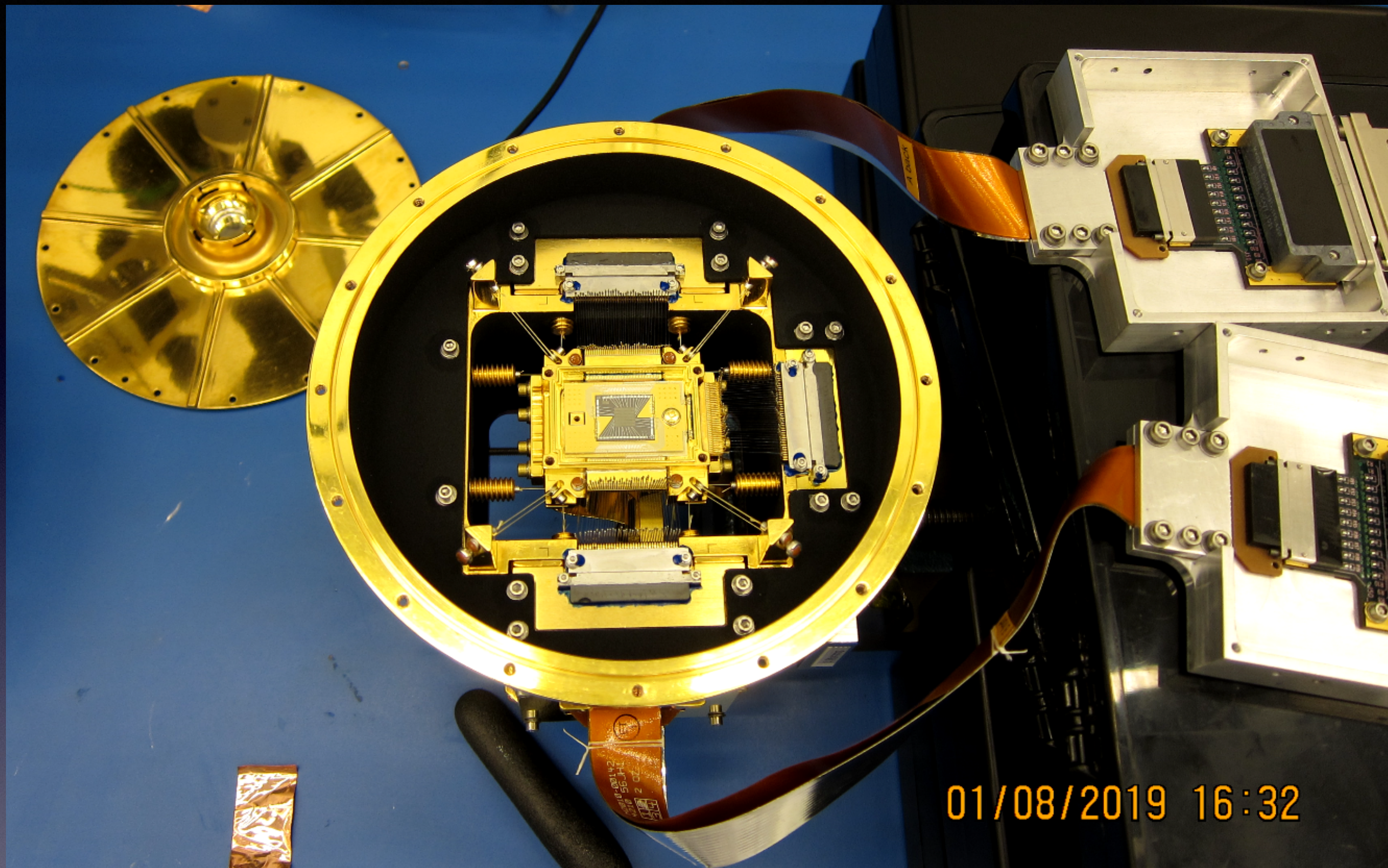
Resolve Top-Level Performance Requirements

Parameter	Requirement	Hitomi Values
Energy resolution	7 eV (FWHM)	5.0 eV
Energy scale accuracy	± 2 eV	± 0.5 eV
Residual Background	2×10^{-3} counts/s/keV	0.8×10^{-3} counts/s/keV
Field of view	2.9×2.9 arcmin	same, by design
Angular resolution	1.7 arcmin (HPD)	1.2 arcmin
Effective area (1 keV)	> 160 cm ²	250 cm ²
Effective area (6 keV)	> 210 cm ²	312 cm ²
Cryogen-mode Lifetime	3 years	4.2 years (projected)
Operational Efficiency	$> 90\%$	$> 98\%$

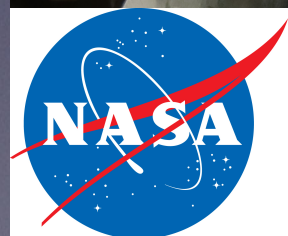
XRISM Mission Timeline

- NASA delivery of calorimeter spectrometer insert (CSI) to Japan - **November 2019**
- NASA KDP-D - **November 2019**
- PV Phase observing proposals internal review begins - **spring 2020**
- XRISM Science White Paper released - **March 2020**
- **JAXA XRISM Integrated System CDR - June 2020**
- Science Team Meeting #3, ~~Ann Arbor, MI~~ virtual world - **June 2020**
- Final selection of PV targets - **Fall 2020**
- NASA AO for XGS program - **late 2020/early 2021**
- NASA delivery of X-ray Mirror Assembly - **January 2021**
- Launch - **early 2022**
- Start of AO1 observations - **late 2022**

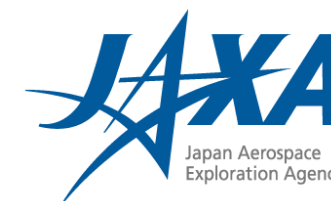


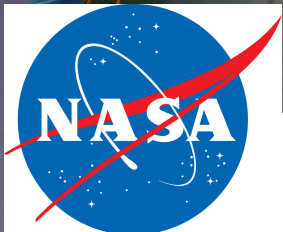
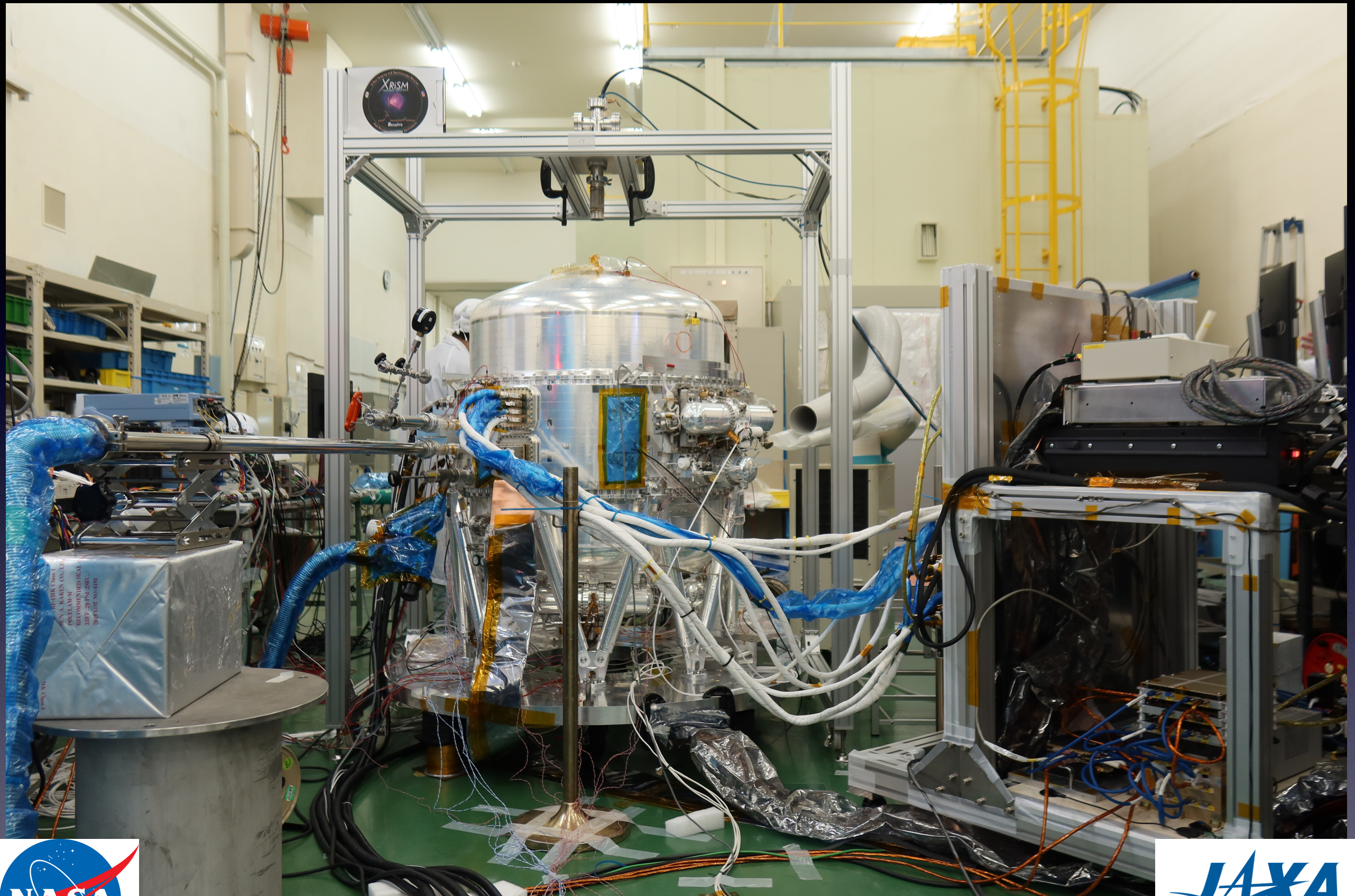


Resolve flight detector assembly

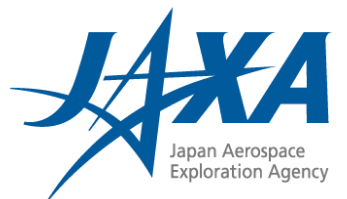


 Sumitomo Heavy Industries, Ltd.

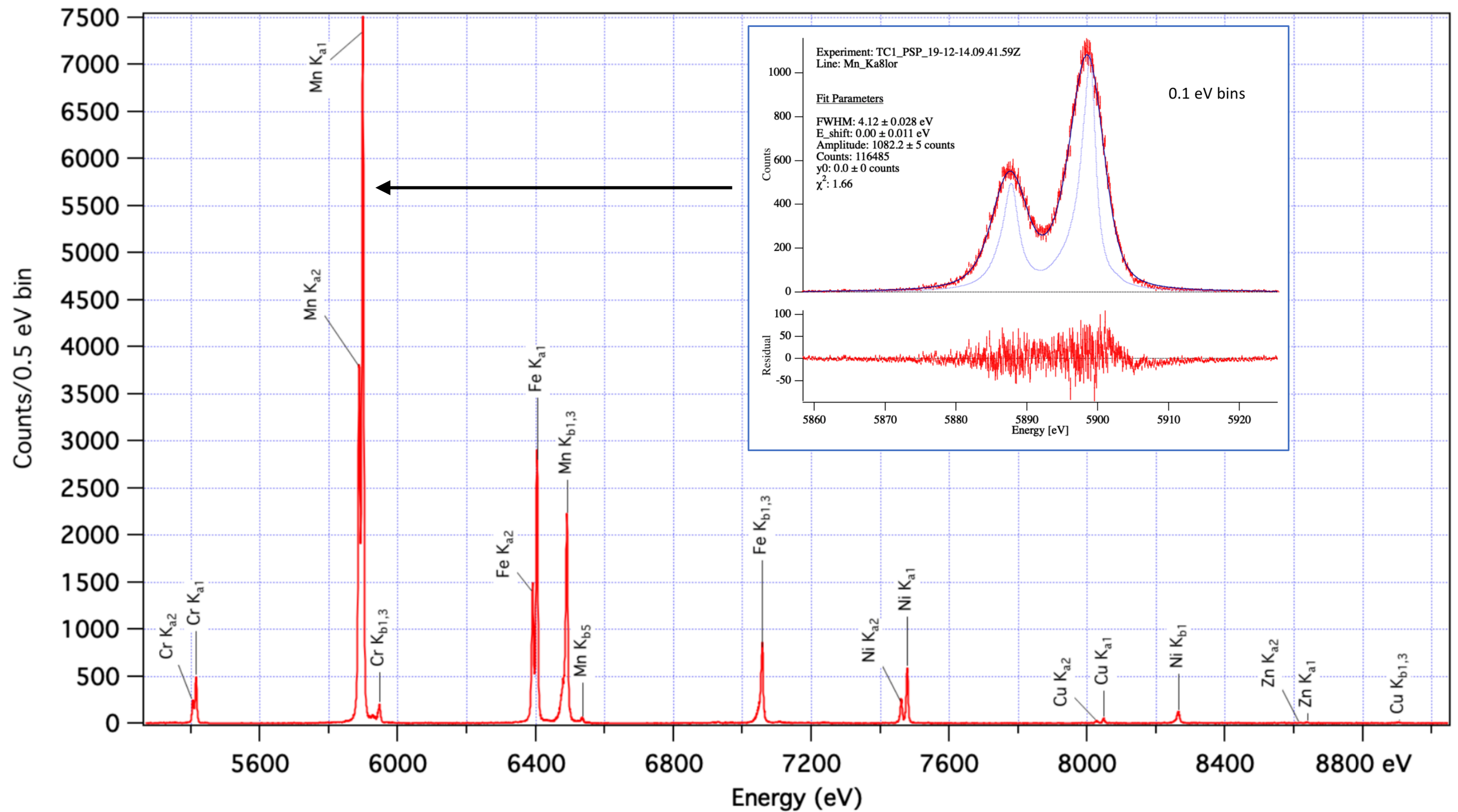




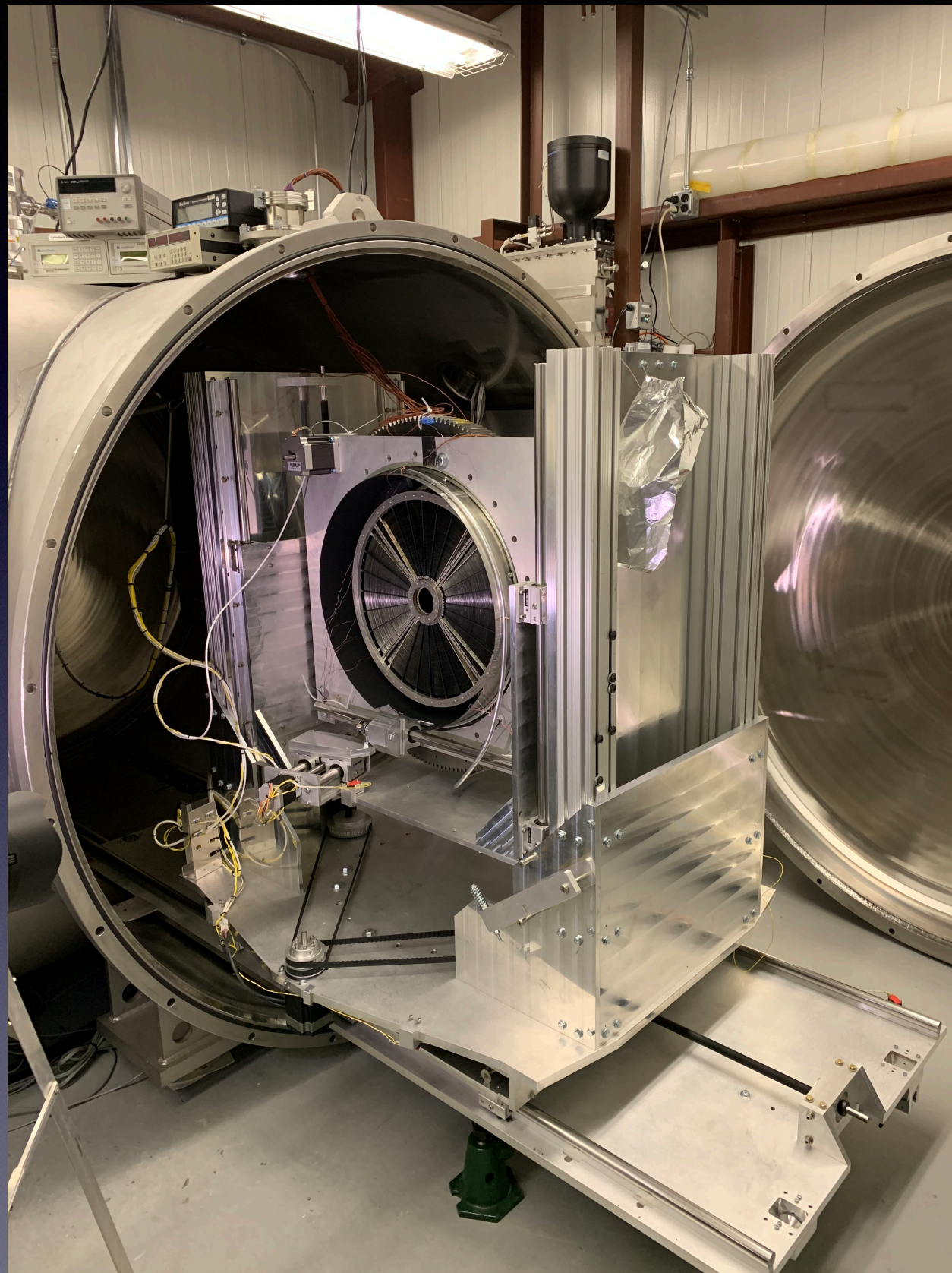
Sumitomo Heavy Industries, Ltd.



Composite histogram of all 35 channels except cal pixel:
All cryocoolers operation and vibration isolators deployed



X-ray Mirror Assembly during testing at GSFC



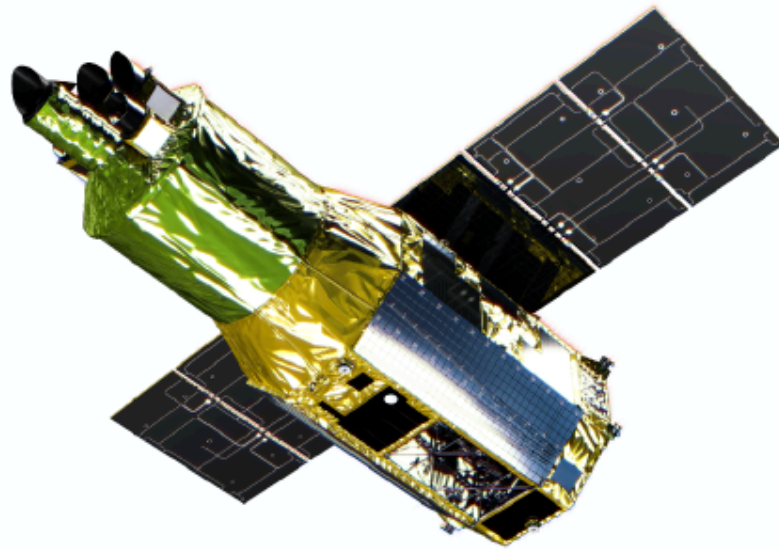
COVID-19 and XRISM

- NASA GSFC is currently in “Stage 4” (most severe) of response framework. There is **NO** travel, and telework is mandatory.
- The CSI for the Resolve instrument was delivered to Japan in November of 2019, and NASA personnel had been present in Japan from then until late February. No travel has happened since then, and we do not know when this restriction will be lifted.
- The NASA Resolve team continues to support I&T via remote participation. Communication is good and IT tools are working well. Both the Japanese and US teams are doing the best they can.
- XMA1 has completed assembly and environmental testing. XMA2 is assembled, but has not yet undergone environmental testing. Once this is complete, both mirrors will move on to calibration.
- The XRISM Science Team holds semi-annual meetings. The spring 2020 meeting was to be held in May in Ann Arbor, MI, but has been changed to a virtual meeting in June.



White paper on science with XRISM

Science with the X-ray Imaging and Spectroscopy Mission



This white paper was prepared by members of the XRISM Science Team for the benefit of the general astronomical community. This paper describes the capabilities of XRISM, offers a sampling of the many science topics that the mission will address, and discusses the synergies of XRISM with the plethora of planned and existing facilities in the 2020s and beyond.

<http://xrism.isas.jaxa.jp>

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arXiv:2003.04962; search ADS for author “XRISM Science Team”

XRISM and You

- **XRISM Guest Scientist (XGS) Program**

- NASA release through ROSES, early 2021
- Allows participation in observation and analysis of PV phase targets
- Individual scientists will join team for (preselected) PV phase targets
- On average, one XGS participant per targets (~50 targets)
- Only individuals can submit proposals, one object per proposal, but can submit multiple proposals
- Dual anonymous review process
- Includes funding for US-based scientists

- **Early Release Science Targets**

- A small number of objects will be observed immediately after commissioning (and before calibration) for immediate public data release
- Allow community a glimpse of instrument performance before AO1 proposals are due
- Data will be uncalibrated, and thus unsuitable for scientific publication

- **XRISM Guest Observer Program**

- Annual cycles, with observations starting 9-10 months after launch
- AO to be released simultaneously by JAXA, NASA, ESA ~2 months after launch, due 3 months later
- Includes opportunity for XRISM-related laboratory astrophysics work
- Includes NASA funding for US-based scientists

Communication with the US Community



- We will be offering XRISM data analysis workshops closer to launch, continuing until after launch
- Additionally, we will prepare data analysis guides and tutorials to prepare community
- Once travel is possible again, members of the Project Science office are available to visit your institution to give a talk on XRISM. Please let us know if you're interested! We can also give virtual talks.